

The work of the wedge has thus been made homogeneous with that of the meridian photometer. The extensive use thus made of the wedge photometer seems to show that the instrument used at Harvard College is not capable of the great degree of precision which is claimed for that employed by Prof. Pritchard. To determine whether this difference is due to the form of the instrument, Prof. Pritchard has kindly undertaken to superintend the construction of a wedge photometer made upon his plan. The number of series of observations made during the year with the meridian photometer is 202; the number of separate settings somewhat exceeding 50,000. The accordance of the results continues satisfactory; the average deviation of the separate measures of the standard circumpolar stars being $0^{\circ}12'$ of a magnitude. The entire series of stars to be observed with this instrument includes zones at intervals of 5° from the equator to the pole; the system adopted insuring a regular distribution of stars down to the ninth magnitude. An important investigation has also been undertaken in stellar photography. A Voigtlander portrait lens of 8 inches aperture and 44 inches focus has been mounted equatorially, and with this many photographs have been taken of the trails left by a star when the telescope is not driven by clockwork, polar stars as faint as the fourteenth magnitude and equatorial stars of the sixth magnitude having been thus photographed. Some most striking results have been obtained with stellar spectra. By placing a large prism in front of the lens, photographs have been obtained of stars as faint as the eighth magnitude, in which lines are shown with sufficient distinctness to be clearly seen in a paper positive. As all the stars in a large region are thus photographed, more than a hundred spectra have been obtained on a single plate.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 FEBRUARY 21-27

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on February 21

Sun rises, 7h. 4m.; souths, 12h. 13m. 48' 0s.; sets, 17h. 24m.; decl. on meridian, $10^{\circ} 28' S.$; Sidereal Time at Sunset, 3h. 30m.

Moon (at Last Quarter on Feb. 25) rises, 20h. 2m.*; souths, 2h. 17m.; sets, 8h. 19m.; decl. on meridian, $0^{\circ} 22' S.$

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	7 13 ...	12 7 ...	17 1 ...	$13^{\circ} 17' S.$
Venus ...	6 1 ...	11 45 ...	17 29 ...	$3^{\circ} 51' S.$
Mars ...	18 48* ...	1 29 ...	8 10 ...	$7^{\circ} 24' N.$
Jupiter ...	20 13* ...	2 15 ...	8 17 ...	$0^{\circ} 22' S.$
Saturn ...	11 49 ...	20 0 ...	4 11* ...	$22^{\circ} 44' N.$

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Variable Stars

Star	R.A. h. m.	Decl. $^{\circ}$	h. m.
U Cephei ...	0 52.2 ...	81 16 N. ...	Feb. 21, 21 38 <i>m</i>
Algol ...	3 0.8 ...	40 31 N. ...	" 26, 21 17 <i>m</i>
λ Tauri ...	3 54.4 ...	12 10 N. ...	" 26, 2 35 <i>m</i>
ζ Geminorum ...	6 57.4 ...	20 44 N. ...	" 22, 20 28 <i>m</i>
U Monocerotis ...	7 25.4 ...	9 32 S. ...	" 26, 19 20 <i>m</i>
S Cancri ...	8 37.4 ...	19 27 N. ...	" 27, 21 30 <i>m</i>
W Virginis ...	13 20.2 ...	2 47 S. ...	" 25, 25 <i>m</i>
δ Libræ ...	14 54.9 ...	8 4 S. ...	" 26, 1 54 <i>m</i>
U Coronæ ...	15 13.6 ...	32 4 N. ...	" 25, 5 0 <i>M</i>
U Ophiuchi ...	17 10.8 ...	1 20 N. ...	" 25, 23 2 <i>m</i>
and at intervals of 20 8			
W Sagittarii ...	17 57.8 ...	29 35 S. ...	" 26, 22 30 <i>m</i>
β Lyræ ...	18 45.9 ...	33 14 N. ...	" 21, 2 30 <i>m</i>
R Lyræ ...	18 51.9 ...	43 48 N. ...	" 24, 7 0 <i>M</i>
δ Cephei ...	22 24.9 ...	57 50 N. ...	" 25, 24, 0 0 <i>m</i>

M signifies maximum; *m* minimum; *m*₂ secondary minimum.

Mira Ceti, R.A. 2h 13.6m., Decl. $3^{\circ} 30' S.$, should arrive at maximum about this time, but there seems a little uncertainty as to the precise date. It is possible that it has already passed the maximum. Its spectrum should be examined whilst it remains bright.

Occultations of Stars by the Moon (visible at Greenwich)

Feb.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
21 ...	Uranus	h. m. 5 53 ...	h. m. 6 34 ...	$51^{\circ} 33'$
23 ...	κ Virginis...	4½ ...	1 3 ...	1 20 ...	325 298
25 ...	49 Libræ ...	5½ ...	2 13 near approach		313 —
Feb. 21 ...	2 ...		Jupiter in conjunction with and $0^{\circ} 8'$ south of the Moon.		
24 ...	16 ...		Mercury in superior conjunction with the Sun.		

GEOGRAPHICAL NOTES

LIEUT. WISSMANN, who was on his way back to Europe from his last great journey in the Congo district, stopped at Madeira for the benefit of his health, and has now returned to Africa for further explorations. Lieut. von Francois, who took part in Lieut. Wissmann's expedition on the Kassai River, has returned to Brussels. He reports that on June 16, 1884, he started with Wissmann from Malange to the Lulua River; thence Wissmann turned northwards and founded the station of Lulua-burg, while Francois investigated the Mukenge district. As he wished to regain Wissmann he built five large boats, in which he reached Lulua-burg on the Lulua. He also met Tchingege, the chief of the Balubas tribe, and Mutenda, one of the first chiefs of the Camokas, who received him kindly. After consulting Wissmann he travelled to the Kassai, which they ascended; then, descending the Congo, they eventually reached Leopoldville, after fifty days' journey. Afterwards Francois accompanied the missionary, Mr. Grenfell, to the tributaries of the Upper Congo. They first ascended the Lulongo (on the right bank of the Congo), and then the Shuapa, which Stanley names the Uranki. The Shuapa retains its name for the whole length of its course, a circumstance which does not often occur in the Congo lands. It is a large river, navigable everywhere, with extremely fertile banks, which for objects of navigation even surpasses the Kassai. The inhabitants of Batua, on the middle Congo, are a real race of dwarfs. The men have an average height of 1.30 metres, the women of 1.10 metres; but they are well developed and very warlike. When the travellers ascended the river they were attacked by the inhabitants, while on the return journey they were very well received. They also discovered the Bussara, a tributary of the Shuapa. Further on they examined the mouth of the Mobangi, a large tributary of the Congo on its right bank. Grenfell is of opinion that the Mobangi and the Welle River, which has its sources in the Southern Soudan, are one and the same river; Francois, however, believes that the Mobangi is the continuation of the Nana River, situated further to the north. Francois states that the land of the Balubas is extremely fertile, no less than three harvests annually being the rule. When exploring the Kassai, Francois and Grenfell found that this river, instead of joining the Uranki (Shuapa), as Stanley supposed, flows into the Congo near Kwamouth. The Leopold Lake flows into the Kassai at a distance of about $1\frac{1}{2}^{\circ}$ from the Congo. The Lulongo runs parallel to the Congo for a considerable distance on its northern side. The two travellers discovered numerous other smaller tributaries.

A RECENT number of *Cosmos* contains an article by M. de Morgan, who was employed by the Government of the Straits Settlements to prepare a map of the State of Perak in the Malay peninsula, on the Stone Age there. In the course of his work, the writer had to visit the range of mountains forming the watershed of the peninsula, and here came into contact with the Sakayes, Seumangs, Rayats, and other pre-Malay Negrito tribes, as nearly in their original state as they can now be found in these regions. He refers to other tribes living in recesses of the mountains, of whom he learnt from the Sakayes. The latter call them "fire apes"; their language is said to have nothing in common with Malay or Negrito dialects. M. de Morgan received here two polished stone axes, which were said to be made by the "fire apes." One was made of a fine-grained yellow porphyry, and was 224 mm. in length, 53 mm. in breadth, and 16 mm. thick; the other was of a green quartz schist, and

was smaller in size. They were polished with great care, and in shape resembled certain Scandinavian stone axes. From inquiries which he made, he came to the conclusion that in recent times there existed in the centre of the Malay peninsula a people wholly ignorant of metals, and he asks whether these "fire apes" are a remnant of the aborigines, who were overwhelmed by a Negrito invasion, or whether they are merely Sakayes who fled before the Malays. The Sakayes, it should be noted, preserve a tradition of the use of stone implements, and it is probable that before the Malay invasion they knew nothing of metals. It is curious to notice that the Malays, who frequently find stone axes in the soil, called them "thunderstones," believing that they proceed from a thunderbolt, thus reproducing an old Breton notion in the centre of the Malay peninsula.

WE have more than once referred to the extraordinary diversity and confusion of the names of States and towns in the eastern half of the Indo-Chinese peninsula. The Marquis d'Hervey de Saint-Denys, well-known for his Chinese researches, has recently read a paper on this subject before the Paris Academy of Inscriptions, which throws much light on the history of this nomenclature. In the sixth century of our era the Chinese, regarding the populations of the present Kuantung, Kwang-si, and Tonquin as barbarians, called them Yuen. When the present Tonquin was conquered and reduced to a Chinese province, they called it Kiao-chi or Kia chow, from the name of the capital, the Hanoi of our days. In 756 they established in Tonquin a great district, which they styled the Annam, or "pacificator of the south." This is the origin of the present designation. In the fifteenth century Annam, then become a feudatory kingdom, was divided into two principalities: the Western Court, Si-tong, and the Eastern Court, Tonquin; hence the latter name. In 1775 the kingdoms of Annam and Cochin China were destroyed by a rebellion, and the last king of the former died at Peking, whither he had fled. The King of Cochin China, however, succeeded in recovering his throne, and in adding, with the consent of the Chinese, Annam to his dominions. But, in ratifying this union, the Emperor of China bestowed a new name on the whole, Yue-nan. The writer concludes that the country called Annam by the Chinese never went beyond the seventeenth parallel of latitude, and that in every document in which the title occurs the present Tonquin is really meant. It would thus appear that there are, historically, only two countries on the east coast of the peninsula, viz. Annam (which is Tonquin, and nothing more) and Cochin China. But this leaves the present Annam to be accounted for. Possibly nothing short of an International Geographical Congress will succeed in producing a simple uniform nomenclature for this region.

THE *Revue Scientifique* bases the following conclusions on the climate of Tonquin on the evidence given by medical and sanitary experts before the recent Commission of the French Chamber on the subject. Compared with Cochin China, Tonquin is not unhealthy; from September to April there is regular spring, and it is from May to October that the heat is almost insupportable. Except in the mountains, which are dreaded by the natives, and in the forests in the neighbourhood of Hung-hoa, there are no deadly fevers as in Cochin China; especially are there no serious diarrhoeas as in the latter. In the delta of the Red River, cultivation and vegetation render it healthy. It is doubtful whether cholera is endemic in Tonquin; the last epidemic appears to have been imported from the Pescadores, and it attacked natives rather than Europeans. But sunstroke is rather prevalent. Two years is the limit assigned for the residence of troops having to undergo great fatigue, with an insufficient quantity of good food; but on occasion this stay may be prolonged without harm to three or four years. Merchants and officials may safely spend fifteen to twenty years in the country.

AT the meeting of the Geographical Society of Paris on January 8, M. Duveyrier described some observations made at Tuggurt in 1860, from which he calculated the latitude at $33^{\circ} 7' 0''$ and the longitude at $3^{\circ} 36' 24''$ east of Paris. M. Le Chatelier sent several notes relating to the southern part of Algeria.

THE *Compte rendu*, No. 1, 1886, of the Paris Geographical Society, contains a suggestion from M. Alphonse de Candolle referring to the want in geographical books and works of travel of an analytical index. These works, he says, contain information on natural history, agriculture, mines, ethnography, lan-

guage, arts, religion, &c., which interest all classes of students, but it is scattered throughout the various works, and few have the patience or the time to get at them by an attentive perusal of the whole. He has often experienced this want himself in preparing his botanical geography, and more recently the work on the origin of cultivated plants. As models of indices he points to Darwin's works, and adds that the more detailed the index is the better. He therefore invites the Society to encourage the addition of indices to geographical works.

THE last *Bulletin* (No. 4, 1885) of the same Society contains the full text of M. Velain's geographical and ethnographical sketch of French Guiana, and the basins of the Yari and Paru, affluents of the Amazon, based on Dr. Crevaux's exploration; of M. de Saint-Pol Lias's account of his journeys in Sumatra and Malacca ("Atché et Pérah"); and of the journeys of MM. Senéze and Noetzi in Ecuador and Peru in 1876-77.

Globus (No. 5, 1886) contains an article by Prof. Blumentritt on the tribe of Guinaus of Abra, in Luzon, based on a communication by Lieut. Trullens, of the Spanish Army, to the *Boletín* of the Philippine Society of the Amigos del País. The article describes the houses, mode of life, manners and customs of the tribe. They are confirmed head-hunters, notwithstanding the presence of Spanish troops and police in their territory. Their superstitions, Prof. Blumentritt says, go to strengthen the theory that the religious notions of the Malays all over the Archipelago are broadly the same. It is noteworthy that he laments the general ignorance of ethnology displayed by most Spanish writers on the Philippine races.

THE LUMBAR CURVE IN MAN AND APES¹

IN this investigation the fresh spines of twelve Europeans, of four anthropoids, of fifteen different species of the lower apes, and several quadrupeds were examined. In each case the body was frozen, and then divided by a saw in the mesial plane. When still in the frozen condition a tracing was taken of the outline of the body, and of the centra of the vertebrae. The results obtained all tend to minimize the importance of the lumbar curve as a distinctive character of any special group. It is present in a well-marked form not only in the chimpanzee, but also in most of the lower apes, and even, under certain conditions, in some quadrupeds (*i.e.* bear). In the chimpanzee the quality of the curve is identical with that of man: it only differs in degree. The latter point could not be absolutely determined, as the four anthropoids examined were little over four years old, and yet the degree of curve was much greater than that of a child of six—indeed it was comparable with that of a child of thirteen.

The second part of the memoir dealt with the adaptation in form of the vertebral bodies to the lumbar curve. By measurements it can be established that in the low races the lumbar curve is not stamped upon the spine so firmly as in the case of the Europeans. In other words, the European lumbar vertebrae are moulded in accordance with the curve, whilst the corresponding vertebrae of the low races are not.

Taking the anterior vertical depth of each vertebral body as 100, the following indices were obtained:—

MAN						
	76 Euro- peans	17 Aus- tralians	3 Tas- manians	3 Bush- men	23 Anda- mans	10 Negroes
Five lower true vertebrae	<i>a</i> 106.1	119.8	115.1	115.9	112.6	113.5
	<i>b</i> 101.4	113.	109.9	113.4	111.2	111.3
	<i>c</i> 97.2	113.6	110.1	109.9	108.1	105.9
	<i>d</i> 93.5	103.9	109.5	100.8	102.6	105.1
	<i>e</i> 81.6	90.4	92.4	95.3	91.4	92
Average index	95.8	107.8	107.2	106.6	104.8	105.4

¹ Abstract of a Paper on "The Lumbar Curve in Man and the Apes, with an Account of the Topographical Anatomy of the Chimpanzee." By D. J. Cunningham, M.D. (Univ. Dub.), Professor of Anatomy in Trinity College, Dublin. Read before the Royal Irish Academy, January 26, 1886.